

AD 675850

TRANSLATION NO. 2301

DATE: Feb 1966

DDC AVAILABILITY NOTICE

This document has been approved for public release and sale; its distribution is unlimited.

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

Reproduced by the
CLEARINGHOUSE
for Federal Scientific & Technical
Information Springfield, Va. 22151

20050208/98

Best Available Copy

Problems of Botulism in Forensic Medicine

By: TADEUSZ MARCINKOWSKI, Poznań, Dolna Włda 38, m.5

(Translated by: Edward Lachowicz, Maryland, Medical-Legal Foundation, Inc., 700 Fleet Street, Baltimore, Maryland, 21202)

Botulism is a disease, the pathogenesis of which has not been sufficiently clarified, as yet. Neither the resistance problems resulting from botulism poisoning have been completely solved, so far. These matters, in addition to others, are of significant importance in medicolegal procedures. As an example, we describe here a case of botulinal poisoning that illustrates strikingly certain difficulties in connection with the medicolegal evaluation of such diseases and, particularly, the difficulties in detection of eventual sources of poisoning. As we know, the incubation period of botulism may be, at times, quite long and extending to 14 days, or even longer. Thus, if we start to search for sources of poisoning in cases with long periods of incubation, and our investigation begins with the appearance of the disease, we encounter great difficulties due to the fact that the products suspected of being a source of poisoning are either completely depleted and consumed, or are destroyed; also, because it is impossible to perform proper laboratory investigations. Prior to the beginning of our discussion of the case of botulinal poisoning, we shall quote briefly certain theoretical data in order to illustrate better the case as such.

There is a familiar opinion of van ERMENGEM that bacillus Cl. botulinum, as such, is not pathogenic and that the actual factor that causes the disease is supposedly the toxin, which is produced by bacillus outside the organism. Although this opinion is still shared by many authors, yet such distinguished investigators like COLEMAN and MEYER, and other prominent researchers and experts in this field, proved without any restrictions that, the spores of Cl. botulinum, administered to experimental animals parenterally or by alimentary canal, develop freely in a living organism and, at the same time, the germs breeding in a living organism develop a specific toxin. No doubt, the number of spores, which had to be admitted in such experiments to an organism to effect the symptoms of infection, always had to be very great.

Thus, according to MEYER'S opinion, besides a pure intoxication with botulism, the cause of illness could be an infection combined with poisoning. In support of the possibility of infection also asserts itself a long incubation period, which can be explained by germination of spores during the time involved. Of course, a lengthy incubation period can be explained by such factors like a quantity of absorbed toxin and by a portal of toxin's entry into an organism, but these explanations are not sufficiently convincing to be accepted without any reservations. Moreover, a frequently observed phenomenon of recurrence of the disease upholds the participation of Cl. botulinum in this process of activity.

It has also frequently been observed that, having ingested botulinal toxin with foodstuffs, not all such persons showed re-

sultant symptoms of intoxication. Considering these observations, attempts were made to explain this phenomenon with the hypothesis of isolated distribution of the toxin in foodstuffs. Consequently, only these persons became sick, who ingested parts of food that contained the toxin, whereas other persons remained healthy. Although such explanation could be regarded as satisfactory pertinently to solid foods, it cannot be applied to liquid products, because the idea of isolated distribution of toxin must be rejected. Inasmuch as, having ingested the same liquid products, some persons get sick, while others remain healthy, undoubtedly the phenomena of resistance play an important role here.

MEYER and GEIGER examined the serum of a man who ingested food that contained large quantities of botulinal toxin. His wife ate the same food and died from botulism poisoning, but he remained healthy and no antitoxin could be detected in his serum. MEISEL, quoting the results of investigations of various authors, states that asymptomatic infections, as well as intoxications with minimal doses of toxin, develop a state of resistance in the organs; at the same time, botulism could not only be a consequence of resultant intoxication, but also of infection, thus the antibotulinal resistance could not only be antitoxic, but also antibacterial.

Thus, a brief review of the above discussed pathogenic problems of botulism facilitates a critical evaluation of poisoning with botulism, which is described next.

L.S., age 36, bought on August 14, 1953, in some store, a certain quantity of liver sausage and of chopped-meat sausage. She and her

two children ate this the same day. She became ill on August 16 with the symptoms of considerable general weakness, headaches and dizziness, vomiting, impairment of vision and abdominal pains. These ailments appeared at noon on August 16, thus two days after eating the liver and chopped-meat sausages. The symptoms became intensified the next day and reached their culmination in evening hours on August 17. Sharp abdominal pains, parched-mouth feeling, trembling of hands and legs appeared; this was accompanied by a fever. The patient was examined by a physician on August 19, who administered two injections of morphine, because of sharp pains. She was admitted to a hospital on August 20. Her two children, showing similar symptoms, were admitted to the hospital at the same time. Their symptoms were less severe and also additional difference was included in the fact that the children suffered from diarrhea, while their mother had a severe constipation. Besides, the children ingested lesser quantities of sausages since they received instead some milk soup at the time in question.

The diagnosis in the hospital indicated a poisoning with botulism, thus antitoxin serum was administered to her. During this time L.S. passed a severe postserum illness at the hospital. She was finally released from the hospital after 2½ months, but the Medical Board continued to excuse her from work for nearly two months henceforth. After this time, she returned to work still having a feeling of weakness in the legs, particularly after a longer time of standing, also the impairment of vision, consequently

she received eyeglasses and was prescribed a light diet.

Next, a lawsuit for indemnities ensued with L.S. and her two small children as plaintiffs. The meat company and its subsidiary processors of meat products refuted all assertions of the complaining party by proving that their properly maintained refrigerators preclude any possibility of development of botulism in their products stored under such conditions.

At the same time, a skilled physician and director of the province's Public Health Service stated in his report that:- "In addition to the three cases of intoxication with botulism, recorded with the family of L.S., no other similar instances were reported within the city limits in August and September 1953. In accordance with the existing regulations, this disease must be reported by public and private medical installations, as well as by freely practicing physicians, thus it can be excluded that additional such illnesses actually occurred during this time. In view of the afore-stated considerations, it should be acknowledged as highly improbable that the cause of the disease in the family of L.S. could be the liver and chopped-meat sausages bought at the store, etc."

In the course of litigations it was also revealed that another woman living in the same house where Mrs. L.S. resided was exposed to poisoning after eating, at the same time, sausages bought in the same store; her illness, however, was much lighter than that of Mrs. L.S.

On September 28, 1954, the plaintiff L.S. was directed by the

court to appear at the Institute of Forensic Medicine for examination and to establish what were the effects of botulism poisoning that occurred on August 14, 1953; also, to determine, whether the aftereffects are of permanent nature, i.e. whether the plaintiff will not return to the same state of health she had prior to the poisoning.

After an inquiry into the matter, I issued the following statement: "On the basis of the medicolegal investigation, as well as in conformity with the data contained in the court records of L.S., the victim of botulism poisoning, I confirm the following remnant symptoms present in this person: weakness in the muscular tension in upper and lower extremities, impairment of visual acuity and diminished nutriture. The afore-mentioned symptoms may be relieved in the future and their degree of exacerbation may subside, but considering the fact that more than a year elapsed from the occurred poisoning, it is necessary to state that the symptoms may not disappear completely within the next two years. Furthermore, the case history of L.S. indicates that she passed through a severe course of the postserum illness. Thus, having suffered from the latter illness that entrains the sensitization developed due to the effects of the therapeutic administration of serum, this exposes L.S. to a permanent effect of the supersensitization to a protein of the serum of animal that was used in the production of administered serum. This necessitates that precautions be taken during eventual therapeutic administration of serum to L.S. in the future, as a need may arise. Consequently, this condition in L.S. may cause certain

limitations of therapeutic opportunities in some cases, e.g. in the case of diphtheria, or it may at least hamper the treatment in such cases. With regard to the statements contained in the court records pertinent to the case of L.S., I make the following assertion:

a) The fact of storing meat products in equipped modern refrigerators does not deny to bacilli of botulism neither survival nor development under this condition; botulism bacilli develop within a broad temperature range and, although their optimum development temperatures are between 25 to 38°C, they can also develop in temperatures from 2° to 50°C. In processing foodstuffs, one has to pay careful attention to a possibility that meat products may become contaminated, particularly with the soil; consequently, in order to prevent this, highest measures of cleanliness must be maintained.

b) In evaluation of the fact that a larger number of poisoning cases failed to show up within the city limits at the time when L.S. family became sick, one must consider the resistance of many people to this disease as a result of having suffered in the past from asymptomatic infections. Thus, it cannot be excluded that cases of poisoning could have occurred also in other persons as a result of eating sausages, but a development of the disease failed to take place, or only mild ailments appeared, which did not suggest suspicions about any morbigenous state."

The above opinion finds its support in statements of many authors cited at the beginning of this report on the subject of

the pathogenesis of botulism. Furthermore, it must be emphasized in the discussed case also this circumstance that incidences of poisoning with botulism may remain unrecognized, as this occurred in the case of L.S. in the first days of her illness, while she still remained at home. Also, this must be considered that, for various reasons, such cases are left unreported to proper sanitary stations. Of course, it cannot be affirmed that, if this or other disease was not reported, its occurrence never took place. It is also improbable that the disease ran its course, but was not reported to proper sanitary authorities. In view of the quoted circumstances, it should be acknowledged that a probability of the illness of L.S. and her children, as a result of eating sausages purchased in any store, is rather high. During the court procedure a proof was submitted that she was a steady customer of the store in question. Although there is a probability of botulism poisoning as a result of eating other foodstuffs and not just meat products, nevertheless, in this case, such a possibility was excluded. Since, in this case, no parts of sausages could be found that one could use for laboratory investigation, the afore-quoted circumstances assume a rather great importance.